FLORA OF THE VENEZUELAN GUAYANA—VI[1]

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ABSTRACT

Studies in the genus Sloanea *(Elaeocarpaceae) for the* Flora of the Venezuelan Guayana *have yielded changes in nomenclature and taxonomic concepts in addition to the following new taxa:* Sloanea bolivarensis, S. cataniapensis, S. davidsei, S. longiaristata, S. merevariensis, S. parvifructa, S. sipapoana, S. steyermarkii *subsp.* autanae, S. steyermarkii *subsp.* jauaensis, S. subpsilocarpa, *and* S. wurdackii. *Notes pertaining to the families Rapateaceae, Bombacaceae, and Theaceae are included.*

RAPATEACEAE

In preparing the treatment of Rapateaceae for the *Flora of the Venezuelan Guayana*, a number of discrepancies have been noted in the previous treatments by Maguire (1958, 1982). In the interest of placing these observations on record before the publication of the flora, the following data are presented.

AMPHIPHYLLUM

Amphiphyllum rigidum Gl.

Maguire (1982: 105) gave the length of the involucral bracts as 3–4 cm long. On the three specimens in VEN they measure 2–2.5 cm long.

CEPHALOSTEMON

Cephalostemon vs. *Duckea*

Maguire (1958) separated *Duckea* on the basis of the exappendiculate seeds. I am unable to separate *Duckea* from *Cephalostemon* on gross morphological characters. They merge as noted in such species as *Duckea squarrosa* and *Cephalostemon gracilis* and should be combined under the earlier-published *Cephalostemon*.

Duckea flava becomes *Cephalostemon flavus* (Link) Steyerm., a new combination.

Cephalostemon flavus (Link) Steyerm., comb. nov. *Duckea flava* (Link) Mag., Mem. New York Bot. Gard. 10(1): 43. 1958.

Cephalostemon junciformis (Mag.) Steyerm., comb. nov. *Duckea junciformis* Mag., Mem. New York Bot. Gard. 10(1): 43, fig. 1. 1958.

Cephalostemon flavus vs. *Cephalostemon junciformis*

The bracteole apex is acute in *C. junciformis* and obtuse to rounded in the commoner *C. flavus*. Maguire (1958) distinguished them on the basis of the globose inflorescence 1–1.4 cm long of *C. junciformis* contrasted with the oblong inflorescence 2–4 cm long of *C. flavus*. This difference does not hold true: several collections of *C. flavus* have short globose inflorescences 1 cm long. Measurements show the following intergradation:

C. junciformis: heads 0.8–1.5 cm high, broadly hemispherical or subhemispherical.

C. flavus: heads 1–4 cm high, depressed subglobose to cylindric-oblong.

The depressed or subglobose short inflorescences of *C. flavus* are represented by the collections of *Maguire et al. 30800, 37662, 30487*; *Huber 4860, 3115, 3129*; and *Vareschi & Magdefrau 6718, 6590.*

Cephalostemon cyperaceoides vs. *Cephalostemon squarrosus*

In general, heads in *C. cyperaceoides* are 1–1.5 cm broad and smaller than in *C. squarrosus* with heads 2–2.5 cm broad. Yet heads in *C. cyperaceoides* vary in size and may reach 2 cm wide in such collections as *Huber & Medina 5905*. In others, such as *Maguire 29276* (identified as *C. squarrosus*), the heads are 2.5 cm wide, while the mature bracteoles are nerved and long attenuate or subulate but not squarrose. Although the bracteoles of *Steyermark 75323* are strongly nerved, they show varying degrees of squarroseness, some

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scarcely or not at all squarrose, others only slightly so.

Also in *C. squarrosus*, specimens are found with strongly nerved squarrose bracteoles, but with small heads only 1.3 cm broad, as in *Vareschi & Magdefrau 6611* (VEN), so that overlapping appears in the sizes of the heads and in the degree of squarroseness. In *Maguire et al. 30799* (identified as *C. squarrosus*), the bracteoles are strongly nerved but are mainly ascending at maturity.

Moreover, *C. squarrosus* and *C. cyperaceoides* do not differ in the type of apex of the bracteole between as described by Maguire in his keys (1958: 42): "bracteoles . . . , apex strongly aristate" in *Duckea cyperaceoides* vs. "bracteoles . . . , apex merely acuminate" in *Duckea squarrosa*. Both have attenuate apices, and no fine distinction can be drawn: the two taxa may have to be merged eventually.

KUNHARDTIA

Kunhardtia rhodantha Mag., Mem. New York Bot. Gard. 10(1): 32, figs. 5, 6. 1958.

Schoenocephalium sipapoanum Mag., Acta Bot. Venez. 14(3): 17. 1984.

Schoenocephalium sipapoanum was based on a collection (*Steyermark et al. 124534*) from the summit of Cerro Sipapo. Although Maguire (1984—see above) noted that it had a general similar aspect to that of *Kunhardtia*, he placed the specimen in *Schoenocephalium* on the basis primarily of its anthers opening by four apical pores instead of being two-celled as in *Kunhardtia*. Other differences thought by Maguire to distinguish the two genera were the conspicuous exsertion of the porrect corollas and depressed-subglobose heads of *Kunhardtia* contrasted with the included corollas and sphaeroidal heads with the mature flowers radiate of *Schoenocephalium*.

These gross morphological characters were observed by the author at the time the type collection was made, and having already seen thousands of individuals of *Kunhardtia rhodantha* on the summit of the nearby Cerro Autana (Steyermark, 1974), the Sipapo collection was noted to be in all respects the same as the common *Kunhardtia rhodantha*. The depressed-subglobose, deep red heads with red, conspicuously exserted porrect flowers, and strongly imbricated leaf sheaths abruptly narrowed at their summits of the Sipapo collection match perfectly the numerous specimens in the colonies of *Kunhardtia rhodantha* seen on the summit of Cerro Autana.

Reexamination and careful comparison of the type collection of *Schoenocephalium sipapoanum* and *Kunhardtia rhodantha* does not reveal any further difference between them. Reexamination of the anthers in the type material of *Schoenocephalium sipapoanum* and *Kunhardtia rhodantha* shows no difference between the two. Moreover, the other characters pertaining to *Kunhardtia* as emphasized by Maguire, together with an examination of additional herbarium specimens, emphasizes the conspecifity of the two taxa.

MONOTREMA

Monotrema aemulans vs. *M. affine*

The key difference separating *M. aemulans* from *M. affine* in Maguire (1958: 46) is that in the former the primary bracts of the inflorescence do not exceed the head or do so only inconspicuously, whereas in *M. affine* they conspicuously exceed the head. However, specimens cited by Maguire, such as *Maguire et al. 30491* from Yapacana savanna, have the bracts somewhat exceeding the heads and are 13 mm long. Thus, *Maguire et al. 30491* could be placed in *M. affine* instead of *M. aemulans*. *Monotrema affine* may have the primary bracts only 10–15 mm long. The isotype of *M. affine*, from Yapacana at VEN, has the longest bracts only 15–16 mm long and barely exceeding the head. The leaves of *M. affine* vary in width from 5–9 mm up to 16 mm in *Huber 5939*, those of *M. aemulans* from 6 to 10(–15) mm. In *M. bracteatum* var. *bracteatum* the leaves are only 2–4(–5) mm wide except in var. *major*, where they are 6–12 mm wide.

Some specimens of *M. aemulans* have bracts usually 8–12 mm long, but in early stages preceding anthesis, as in *Steyermark et al. 130334* from Cerro Vinilla (VEN), they are only 1–5.5 mm long and equal the head, or they are slightly shorter to only slightly longer than the head. The two taxa are otherwise similar vegetatively and occur in the same Yapacana savanna.

The collections *Huber & Tillett 2965* (identified by Huber as *M. xyridoides*) and *Huber & Medina 5939* (identified by Maguire as "*M. affine* with broad leaf blades *vel valde aff.*") are forms with leaves 1.4–1.5 cm wide and leaf sheaths 14–15 cm long, whereas other collections of *M. affine* vary in leaf width from only 0.5 to 0.9 cm. The broadly ovoid heads are also longer than broad as in *M. xyridoides* and are 17–21 mm long × 12 mm broad at the middle. The outer involucral bract is 21 mm long and barely longer than the head. Perhaps these represent introgressive collections

of *M. xyridoides* and *M. affine*. *Huber 1640*, identified as *M. bracteatum*, has the shorter broader outer bracts of *M. affine* and the shorter secondary bracts of *M. affine*.

A third species, *M. bracteatum*, with all the bracts elongated, occurs in the Yapacana savanna and occasionally is confused with *M. affine* which has shorter, broader outer bracts.

A fourth species, *M. xyridoides*, with heads usually longer than broad having bracteoles rounded or obtuse, likewise occurs in the Yapacana savanna.

Monotrema bracteatum may be confused with *Cephalostemon cyperacoides* on account of the outer bracts, which in *C. cyperacoides* are reflexed, whereas those of *M. bracteatum* and *M. affine* are spreading to ascending.

Monotrema bracteatum subsp. *bracteatum*

Huber 3268 from W of Serranía El Tigre (identified as *M. affine* by Maguire) represents *M. bracteatum* subsp. *bracteatum* with the bracts and bracteoles long pointed.

Monotrema arthrophyllum (Seub.) Maguire, Mem. New York Bot. Gard. 10(3): 47. 1958.
Schoenocephalium arthrophyllum Seub. in Mart., Fl. Bras. 3(1): 131. 1847.

This species was originally described from Arara-Coara, Río Caquetá, Colombia. *Maguire et al. 44109* from scrub savanna, Araracuara, identified by Maguire as *M. aemulans* Körnicke, is a topotype of *Schoenocephalium arthrophyllum*. In his English key (1958, p. 46) Maguire gave "5–10-flowered" for *M. arthrophyllum*, as contrasted with "numerous" and "50–75-flowered" for *M. aemulans* in both his English (1958) and Spanish (1982) treatments. This collection matches the photo of the type of *M. arthrophyllum* in shape and width of leaf, abrupt contracted leaf sheath summit at the base of the leaf blade, and much shorter leaves compared with the peduncle length. The leaf blades are strongly 11-nerved on the lower side, 13–14 mm wide, 14–22 cm long, and show the leaf sheath strongly 7–8 nerved. This compares well with the type photo of *M. arthrophyllum*. Although *Maguire et al. 44109* has strongly nerved leaf sheaths, they do appear, although not very sharply, on the type photo of *Schoenocephalium arthrophyllum*.

A specimen from Yavita, Territorio Federal Amazonas (*Williams 14086*, VEN), originally identified by Maguire in 1950 as *M. arthrophyllum*, was later identified by him as *M. aemulans*. Although never cited by Maguire (1958, 1982), this specimen partly agrees with the description and key characters assigned by him (1958) to *M. arthrophyllum* in having fewer spikelets with heads which are not subdidymous. However, the linear leaves are only 3.5–7 mm wide, whereas in the photo of the type of *Schoenocephalium arthrophyllum* they are broader. The *Williams 14086* specimen from Yavita does not match either the photo or the *Maguire et al.* collection from Colombia. Its much narrower leaves 3.5–7 mm wide merge, but not abruptly, at the base into the leaf sheath, which is 6 cm long and 4 mm wide. Also, the leaf blade and sheath are not strongly nerved as in the Colombian collections and are 21–25 cm long. The head is 8 mm wide and hemispheric as in *M. aemulans*, but the head is too small and few-flowered to be placed in *M. aemulans*. Probably, as Huber concluded, the specimen represents a depauperate inflorescence form of *M. xyridoides* rather than a form of *M. aemulans*, as *M. arthrophyllum* was interpreted by Maguire.

PHELPSIELLA

Phelpsiella ptericaulis Maguire

The genus is described in Maguire's (1958) generic key as having yellow petals, but the *Hoyos & Morillo 518* collection from Laguna Asisa, Cerro Asisa, Serranía Parú indicates that the flowers are white. The winged strongly compressed stem and narrow leaf blades are strongly reminiscent of *Stegolepis breweri* Mag.

SCHOENOCEPHALIUM

Schoenocephalium cucullatum
vs. *coriaceum*

The distinctions made between *S. cucullatum* and *S. coriaceum* (in Maguire's key, 1958: 37) were based on the relative distance separating the upper bracteoles and the tip of the sepals (in *S. coriaceum* the sepals exceed "the upper bracteoles by (3)4–5 mm in length," whereas in *S. cucullatum* the sepals exceed the upper bracteoles "2(3) mm or less in length." Also, the width of 14–16 mm is given for the leaf blades of *S. coriaceum* contrasted with that of "2.0–3.5 cm" for *S. cucullatum*. These differences have been found inconstant. It should be noted that although Maguire described the leaves of *S. cucullatum* in his key as "2.0–3.5 cm broad," none of the specimens from VEN, including the paratype (*Maguire et al. 37631*) and the isotype (*Maguire et al. 30486*) of *S. cucullatum* have leaf blades exceeding 1 cm.

Moreover, of all the specimens examined at VEN of *S. cucullatum* determined by Maguire, the leaf blades vary from 0.8 to 1.7 cm broad, those in *S. coriaceum* varying from 0.5 to 1.3 cm. With the material at hand, the specimens cannot be separated on either of these characters and, in combining them as conspecific, I am employing the binomial *Schoenocephalium cucullatum*.

It should also be noted that in *S. teretifolium* the sepals exceed the upper bracteoles by distances of 6–10 mm instead of, as stated, by "(3–)4–5 mm" (1958). The same error occurs in *S. cucullatum*, where the sepals exceed the upper bracteoles by 2–4 mm and in *S. coriaceum* by 2–6 mm.

Schoenocephalium martianum Seub.

It is probable that *S. martianum* Seub. may eventually be considered synonymous with *S. cucullatum*, in which case *S. cucullatum* has priority. However, differences in sepal length in relation to the bracteoles, leaf sheaths, and leaf blades appear to justify their separation for the present. The leaf sheaths in *S. cucullatum* are shorter and terminate more abruptly at the base of the leaf blade, whereas in *S. martianum* the leaf sheaths are more elongated and merge at their summit more directly with the leaf blade. In *S. martianum* the sepals exceed the upper bracteoles by 7–10 mm. Also, the leaves are longer in *S. martianum* than in *S. cucullatum* and *S. coriaceum*. I have seen a topotype of *S. martianum* from Colombia (*Maguire et al. 44179* VEN, scrub savanna Araracuara, Vaupés).

SAXOFRIDERICIA

Saxofridericia duidae vs. *S. grandis*

The separation of *S. grandis* from *S. duidae* on the basis of the presence of a petiole between the base of the leaf blade and the summit of the leaf sheath is not evident on some specimens. In his (1958) key, Maguire differentiated them as follows:

Petioles absent, the leaf passing directly from the summit of the leaf sheath to the leaf blade . . *S. duidae*
Petioles 10–15 cm long, uniting the summit of the leaf sheath with the leaf blade proper . . . . . *S. grandis*

However, in *Huber 4426*, a topotype of *S. grandis* from Serranía Parú, the length of the petiolar portion varies from only 1 to 2 cm long to as much as 8.5 cm long in *Huber 4347*, also from Parú. Although the description of *S. grandis* gives 10–15 cm as the length of the petiolar portion, the isotype (*Cowan & Wurdack 31115*) at VEN has the petiolar portion only 4 cm long. Maguire (1958) stated that *S. grandis* is the only species of subgenus *Saxofridericia* to have developed a distinct petiole. In Huber's specimens the summit of the peduncle beneath the head is sharply angled, flattened, glaucous, and broadened to 2–2.7 cm. The leaf blades in *S. grandis* vary from 3.5 to 4.5 cm wide (4–5.5 cm wide according to Maguire). The sheath in *S. grandis* is strongly indurated and 4–7 cm wide.

Saxofridericia duidae, confused with *S. grandis*, does not possess a petiolar portion between the summit of the sheath and the base of the leaf blade, the sheath is narrower (2–3 cm wide), less indurated, conspicuously carinate dorsally, the peduncle below the head narrower (1.2–1.7 cm wide), less conspicuously ampliated, with stronger ribbing, and the leaf blades mainly narrower (2.5–3.5–4) cm, but overlapping the measurements of *S. grandis*. However, although the other specimens of *S. duidae* lack petiolar interruptions between the leaf sheath and the leaf blade, the VEN paratype of *S. duidae* (*Maguire & Maguire, Jr. 29122*) has an elongated petiolar portion 10–18 cm long, although it has the narrower leaf blades, narrower leaf sheath with dorsal keel, and narrower apical part of the peduncle characteristic of *S. duidae*. The base of the leaf blade in this specimen is so narrowly attenuate as to appear petiolate and could be interpreted as sufficiently petiolate as the material seen of *S. grandis*.

An additional character, however, for differentiating the two taxa is that in *S. duidae* the bracteoles surrounding each flower are more conspicuously pungent and more conspicuously imbricate with looser, longer, narrower apices, whereas in *S. grandis* the bracteoles are more appressed, with shorter, less pungent tips from a more broadly shaped contour. This paratype thus breaks down the distinctions between the two taxa, which are otherwise separated by the differences enumerated above.

Saxofridericia compressa
vs. *S. spongiosa*

Maguire's dimensions given for the diameter of the heads, peduncles below the summit of the head, and the leaf width do not apply to collections from VEN not seen or not annotated by him. Thus, the width of leaf blades separating *S. compressa* and *S. spongiosa* (4–5 cm against 7–10 cm broad respectively) must be changed to 3–8 cm and 4.5–9 cm, respectively.

Saxofridericia petiolata vs. *S. inermis*

The fibrous marcescent character of the leaf sheaths of *S. petiolata* versus the nonmarcescent, nonfibrous character of *S. inermis* is not apparent on specimens identified by Maguire. Although used as one of the separating key characters (1958), it does not serve to identify most extant herbarium material.

STEGOLEPIS

Stegolepis microcephala Maguire

This is keyed out by Maguire as having the "mature sheaths hardened and nerveless." However, the type specimen has the sheath clearly nerved.

Stegolepis membranacea Maguire

The bracteoles are described as somewhat obtuse, but in *Steyermark et al. 129658* from Marahuaca, the bracteoles are subacute, and the sheath and the summit of the auricle have thin brown margins. The specimen is referred to *S. membranacea* because of the nerved sheath (in the upper part) and lack of broad white scarious auricle.

Stegolepis neblinensis Maguire

This species was placed in the section having spikelets 5–50, but in *S. neblinensis* the spikelets are only 1–3 (peduncles 2–4). In the Spanish key (*Fl. Ven.*) there is confusion in the couplet "10" which gives "sepals" not reflexed.

If the indurated sepals are absent, and only the bracteoles remain, then the length measurement is only 2 cm instead of the "2.5–3.5 cm" given for this species.

Stegolepis parvipetala Steyerm.

On the basis of the number of spikelets, supposed to be "70–100," the isotype (VEN) cannot be properly disposed, since the spikelets are less than 70 (actually there are 50 or fewer), thus relegating it to another part of the key. The key on p. 109 (1982, *Fl. Ven.*) gives the length of the spikelets as "10–16" mm. However the text (p. 120) gives "14–16" mm. In the key to the subspecies, the spikelets are "14–15" in subsp. *parvipetala* and "10–12" in subsp. *chimantensis*.

Stegolepis parvipetala is characterized by the rounded or broadly obtuse apices of the lower and middle bracteoles, blunt apex of the spikelet, thick diameter of the peduncle, conspicuously swollen summit of the trigonous summit of the peduncle, and small petals.

Stegolepis pauciflora Gleason

Although this species is placed by Maguire in that part of the key (1982, *Fl. Ven.*, p. 111) having "auricles of the sheath not ligulate," actually they may attain a length of 25 mm, whereas in *S. hitchcockii* they are ca. 10 mm long.

Stegolepis ptaritepuiensis Steyerm.

The key (1958) gives leaf blades "2–2.5 cm" wide, but the text states "2–4.5 cm" wide.

Stegolepis pungens Gleason

The key in *Fl. Ven.* (1982: 110) gives spikelet measurement "3–8.8" cm. It should be "3–3.8" cm as given in the text. Actually some spikelets are less than 3 cm (2.5–2.8 cm).

Stegolepis steyermarkii Maguire

This species is poorly segregated in the key on the basis of the nervation of the leaf sheaths and their relative thickness or induration. Although nerves may be present along the margin, they are not always present on the rest of the sheath as in some other species. The sheaths may be indurated, as in *Steyermark et al. 92498*, making it difficult to determine into which part of the key to place the specimen.

Stegolepis steyermarkii vs. *S. ferruginea*

Although these two species are very similar, they may be distinguished by the key characters given by Maguire (1965: 71), with *S. steyermarkii* having narrower and longer leaf sheaths, glabrous vs. minutely puberulent petals, narrower leaf blades (not given by Maguire), a more conspicuous, broader, and more elevated midrib below, and a more attenuate narrower leaf apex.

Although the two species are apparently distinct, it should be noted that the length of some leaf sheaths of *S. steyermarkii* is not as long as that originally stated, i.e., 15–20 × 4.5 cm in text (18–20 × 3.5–4.5 cm in key). The type specimen shows the basal part of the plant with the sheath length complete. However, one of the paratypes (*Steyermark & Nilsson 296* NY) has a lone sheath only 12.5 cm long, taken from an inner relatively shorter sheath. Other collections, such as *Croat*

53998, have sheaths 16 cm long. The latter specimen has the sheathing portion cut off above the base so that the length shown is not complete.

Stegolepis vivipara

Examination of the isotype (*Steyermark & Wurdack 332*) at VEN shows only 15–20 spikelets and not 25–35 as stated in the original description. The heads are 3.5 cm in diameter. The bracteoles are ± 20–25 and not "ca.16" as given by Maguire (1965). They are orbicular or orbicular-ovate, as stated, and pale brown with scarious margins. The midnerve is prominent below with many fine nerves, but much less manifest than in *S. parvipetala* and subsp. *chimantensis*. The upper leaf surface has many fine nerves with a sulcate midrib as in *S. parvipetala*. The leaf sheath is soft, papyraceous, or submembranaceous and has many fine, closely crowded nerves. The leaf apex is subacute or narrowed to an obtuse or subobtuse apex. The broadly obovate petals, described as 22–24 mm long by Maguire (1965), are only 15 mm long and 12 mm wide in the dried state. The sepals are many-costate and 3.5–5 mm wide (3–4 mm as given by Maguire).

All the bracts of a spikelet are more or less uniformly broadly suborbicular-ovate, obtuse, or subobtuse, whereas in *S. angustata* the upper ones are more narrowed to a subobtuse or subacutely obtuse apex and are relatively longer than broad. In *S. vivipara* the bracts are more uniform and only slightly longer than broad. Also, the bracts of *S. vivipara* are paler and have more scarious margins and a brown apex when contrasted with *S. angustata*, in which the bracts are darker brown and lack scarious margins and a brown apex.

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Notes on *Sloanea* (Elaeocarpaceae) in the Venezuelan Guayana

The following notes are based on a treatment of the genus *Sloanea* in preparation for a *Flora of the Venezuelan Guayana*. This has necessitated a study of newly collected material obtained from recently completed expeditions to previously unexplored areas, as well as a restudy of specimens identified by previous workers. I am grateful to the curators of F, GH, NY, US, and VEN for the loan of critical material.

As a result of the present study, nine new species are recognized, and critical comments on other species are given. The revision by C. E. Smith (1954) on the New World species of *Sloanea* elaborated 62 species, of which nine included taxa from the Venezuelan Guayana and eight species from other parts of Venezuela. An additional species, *S. floribunda* Spruce ex Benth., collected at San Carlos de Rio Negro, was erroneously ascribed to Brazil instead of Venezuela. Two additional species from the Venezelan Guayana, *S. crassifolia* and *S. steyermarkii*, were published by Smith in 1962 and 1967, respectively. Steyermark and Marcano-Berti described *S. megacarpa* from the Guayana in 1966, and additional taxa originating from the Venezuelan Guayana were described by Steyermark in 1976 and 1978. Species not originally cited by Smith are now known to occur in the Venezuelan Guayana as a result of recent expeditions into that territory. They include, in addition to those published since Smith's revision and the nine described below, *S. caribaea*, *S. guianensis*, *S. pubescens*, *S. multiflora*, *S. robusta*, *S. synandra*, and *S. terniflora*. *Sloanea pitttieriana* and *S. ptariana*, previously included by Smith as synonyms of other taxa, have been newly studied and found to merit specific recognition.

Sloanea floribunda Spruce ex Benth., J. Linn. Soc., Bot. 5: suppl. 66. 1861.

Sloanea maroana Steyerm., Pittieria 7: 14. 1978.

A reexamination of *S. maroana* Steyerm. shows that it cannot be maintained apart from *S. floribunda*.

Sloanea laurifolia (Benth.) Benth., J. Linn. Soc., Bot. 5: suppl. 70. 1861.

This species was treated by Smith (1954) as highly variable and included *S. oppositifolia* Spruce ex Benth. as well as the collection *Cardona 1951* from the Venezuelan Guayana along the Río Merevari, which was assigned an herbarium name by Pittier but never published. *Schomburgk 936*, upon which *Dasynema laurifolium* Benth. (basionym of *Sloanea laurifolia*) was based, has opposite, acuminate leaf blades identical with that of *Spruce 3689*, the type of *Sloanea oppositifolia* Spruce ex Benth. The leaf blades in both collections are glabrous throughout and ovate- or oblong-lanceo-

late. *Cardona 1951*, on the other hand, is distinct in having alternate, obovate, rounded leaf blades that are densely tomentose on the upper and lower midnerves. It further differs from the collections of both *S. oppositifolia* and *Dasynema laurifolium* in having acute instead of obtuse awns on the anthers, and styles free to the base instead of shortly parted only at the apex.

Sloanea macrophylla Benth. ex Turcz., Bull. Soc. Imp. Naturalistes Moscow 31(1): 224. 1858.

The dimensions given by C. E. Smith (1954) for the stamens of this species were taken from flowers in a very early stage of anthesis. He described the stamens as "4–6 mm long; filaments 0.5–1 mm long, usually flattened laterally, minutely puberulent; anthers 2–4 mm long, lanceolate, minutely puberulent, connective prolonged into a glabrous awn 0.3–0.5 mm long." However, in other collections referred to this species (*Liesner et al. 20919*) it was noted that as the flowers mature the filaments and appendages of the anthers became more elongated. *Sloanea caudata* Steyerm., placed by Smith (1954) in the synonymy of *S. macrophylla* also has much longer staminal dimensions than those described for that species.

Sloanea pittieriana Steyerm., Fieldiana, Bot. 28: 359. 1952.

This species was reduced to synonymy by Smith (1954) under *Sloanea fendleriana* Benth. *Sloanea fendleriana* was based originally on a specimen collected by Fendler (*2489*) from the Coastal Cordillera of northern Venezuela. *Sloanea pittieriana* was described from a collection originating in the Venezuelan Guayana Highland, some 700 kilometers distant. Reexamination of the type material of these two taxa and study of additional collections shows them to be quite distinct. Although vegetative differences occur, the chief distinctions are found in the termination of the anther and in the spines of the capsule. In *S. pittieriana* the apex of the anther is obtuse and has an obsolete, minute, scarcely discernable knob. By contrast, the anther of *S. fendleriana* terminates in a shortly acuminate summit, originally described by Bentham (1861) as "breviter acuminatae," or as "prolonged into a small puberulent knob or short awn," as described by Smith (1954). Fruiting material of *S. fendleriana* collected near the type locality in Estado Aragua (Pittier National Park, *Pittier & Nakichenovich 15425* VEN), identified by Smith, has merely granulose capsules lacking spines, whereas capsules obtained within the distributional area of *S. pittieriana* and referred to that species have slender, rigid, glabrous spines.

Vegetative differences are likewise evident. In *Sloanea fendleriana* the lateral secondary nerves terminate dichotomously 3–8 mm from the leaf margins, and the veinlets of the lower surface are prominently reticulate. As opposed to this, the lateral nerves of *S. pittieriana*, best observed on the lower leaf surface, usually extend to the margins without branching, although some branching may be present 3–5 mm from the margin. Furthermore, the tertiary venation of the lower surface is less conspicuous, less elevated, and more impressed. Finally, the lateral nerves of *S. pittieriana* are more equidistant than in *S. fendleriana*, the latter with the nerves irregularly spaced.

The following specimens, all from the Venezuelan Guayana, pertain to *Sloanea pittieriana*: BOLÍVAR: Ptari-tepui, *Steyermark 59984* (holotype, F; isotype, VEN); Ptari-tepui, *Steyermark 60261* (F); between Eldorado and Luepa, plateau of Cerro Venamo, *Steyermark & Nilsson 799* (VEN); Amaruay-tepui, *Holst & Liesner 2840* (MO, VEN).

Sloanea ptariana Steyerm., Fieldiana, Bot. 28: 360. 1952.

This taxon, described from Ptari-tepui in the Venezuelan Guayana, was reduced to synonymy by C. E. Smith (1954) under *Sloanea picapica* Standley, a species based on fruiting material from Honduras. The holotype of *S. picapica* (*C. & W. von Hagen 1390* NY), together with additional paratype specimens from Central America, identified as *S. picapica* by Smith, have been restudied by the author. No flowering material of *S. picapica* has been collected up to the present, but Damon Andrew Smith stated in his unpublished thesis (1985) on the Costa Rican species of *Sloanea*, that, although no flowers of *S. picapica* had been seen, stamens were found adhering to very young fruits. He described them as being short-tomentose. His detailed description of the stamens is as follows: "filaments at least 1.7 mm long, 0.04 mm in diameter; anthers 0.6–0.9 mm long, about 0.2 mm wide, basally slightly cordate; anther sacs opening along entire length, but most widely at apex; awn about 0.04–0.08 mm long, obtuse."

Although no flowers of Central American specimens of *Sloanea picapica* were available to C. E. Smith for study, he based his detailed description of the flowers upon the flowering collection of the holotype of *S. ptariana*. However, the stamens of

S. ptariana are quite unlike those found by Damon Smith in *S. picapica*. Although the stamens of *S. ptariana* were originally described as pubescent, reexamination, as verified by C. E. Smith (1954), showed that they were glabrous throughout. In addition to the glabrity of the stamens in *S. ptariana*, the filaments of that taxon are longer (3–3.5 mm) than those of *S. picapica*.

Additional differences between these two taxa may be observed in their leaves. In *Sloanea ptariana* the lateral nerves extend nearly unbranched to the margin and anastomose 1–3 mm from it. In the Central American specimens of *S. picapica* the lateral nerves branch farther from the margin (in *Little 25400*, 4–6 mm from the margin before anastomosing). The apex of the leaf in *S. ptariana*, moreover, is also longer and narrower throughout its length, and 3–6 mm wide at the base; in the Central American specimens of *S. picapica* the apex averages shorter and broader at the base, where it is 7–9 mm wide.

Based upon the staminal and vegetative differences noted between *Sloanea ptariana* and *S. picapica*, I am reinstating the former as a distinct species. This eliminates the previously held erroneous concept of a disjunct geographical range for *S. picapica*, a disjunct range not normally found between Central American and Guayana Highland taxa.

Sloanea bolivarensis Steyerm., sp. nov. TYPE: Venezuela. Bolívar: 7 km NE of Ciudad Píar, 7°28′N, 63°14′W, 350–500 m, 10 Apr. 1981, *Ronald Liesner & Angel Gonzalez 11479* (holotype, VEN; isotypes, MO, NY). Figure 1.

Arbor 25 m, foliorum laminis obovatis apice obtuse acutis basi acutis majoribus 17–20 cm longis 8–11 cm latis, marginibus utroque latere 11–18 repando-dentatis subtus costa media nervis lateralibusque hirsutulis; petiolis 1.7–2.5 cm longis dense hirtellis; inflorescentiis lateralibus umbellatim 2–3-floris, pedunculis 1.5–2 cm longis dense hirtellis; pedicellis 10–15 mm longis dense hirtellis; sepalis quattuor aequalibus 7–9 mm longis; antheris 1.8–2.1 mm longis hispidulis connectivo in acumen hispidulum 1.5 mm longum producto; filamentis 1.2–1.5 mm longis dense hirsutulis; ovario hispidulo, stylo torto glabro.

Tree, 25 m tall, the branches hirtellous. Leaves alternate or subalternate. Petioles 1.7–2.5 cm long, densely hirtellous; leaf blades obovate, obtusely acute at the abruptly prolonged apex, narrowed to an acute base, the larger ones 17–20 cm long, 8–11 cm wide, the margins each side 11–18 repand-dentate or coarsely obtusely dentate; lower midrib and lateral nerves hirsutulous, upper midrib minutely hirtellous, glabrous elsewhere on lower and upper leaf surfaces; lateral nerves 12–16 each side, ascending at 25–30°; tertiary venation finely elevated, minutely reticulate both sides. Inflorescence lateral, near summit of branch, umbellately 2–3-flowered; peduncle 1.5–2 cm long, densely gray-hirtellous; pedicels 10–15 mm long, densely gray-hirtellous. Sepals 4, equal, ovate, acute, 7–9 mm long, 3–5 mm wide, both sides minutely puberulous. Anthers lanceolate, 1.8–2.1 mm long, hispidulous, dehiscing laterally, the connective prolonged into a hispidulous awn 1.5 mm long, somewhat shorter than the body of the anther; filaments 1.2–1.5 mm long, densely hirsutulous. Ovary hispidulous; style 2.5–2.8 mm long, twisted, glabrous. Capsule not seen.

The twisted style and umbellately few-flowered inflorescence relate this new taxon to *Sloanea garckeana* Schum., from which it differs in having anther awns uniformly pubescent; densely pubescent, shorter pedicels and peduncles; and wider repand-dentate to coarsely dentate leaf blades.

Specimens of *Sloanea garckeana* identified by C. E. Smith and D. Alforo Castañeda show a range of variation. The species, originally based on the collection *Riedel 888* from the province of Rio de Janeiro, has entire or subentire, oblong or oblong-lanceolate, acuminate leaf blades 2–5 cm wide, 2–3-flowered inflorescences on elongated peduncles 5–6 cm long, sepals 8–9 × 4–4.5 mm, anthers (including the apical appendage) 5 mm long with the appendage described as glabrous, and tomentose filaments 3–4 mm long. Although Smith (1954) allowed for a range in variation of the anther appendage from sparsely pubescent to glabrous, the material I have examined has glabrous awns principally. Smith (1954) also allowed for a wide range of variation in glabrity and length of peduncles and pedicels.

Sloanea cataniapensis Steyerm., sp. nov. TYPE: Venezuela. T. F. Amazonas: Dept. Atures, N side of Río Cataniapo, 48 km SE of Puerto Ayacucho, 5°35′N, 67°15′W, 200–300 m, 10 May 1980, *Julian A. Steyermark, Gerrit Davidse & Francisco Guanchez 122215* (holotype, VEN; isotype, MO). Figure 2.

Arbor 15 m, foliorum laminis elliptico-ovatis vel oblongo-ellipticis apice abrupte acutis basi acutis vel subobtusis 7–12.5 cm longis 3.5–6.5 cm latis integerrimis praeter costam mediam subtus minute puberulentem glabris; inflorescentiis 3–7-floris, pedunculis primariis semel ramosis 5.5–9 cm longis dense puberulentibus omnibus umbellatim 3-pedicellatis, axibus lateralibus 1-floris; pedicellis 2–4 cm longis dense puberulentibus; sepalis quattuor

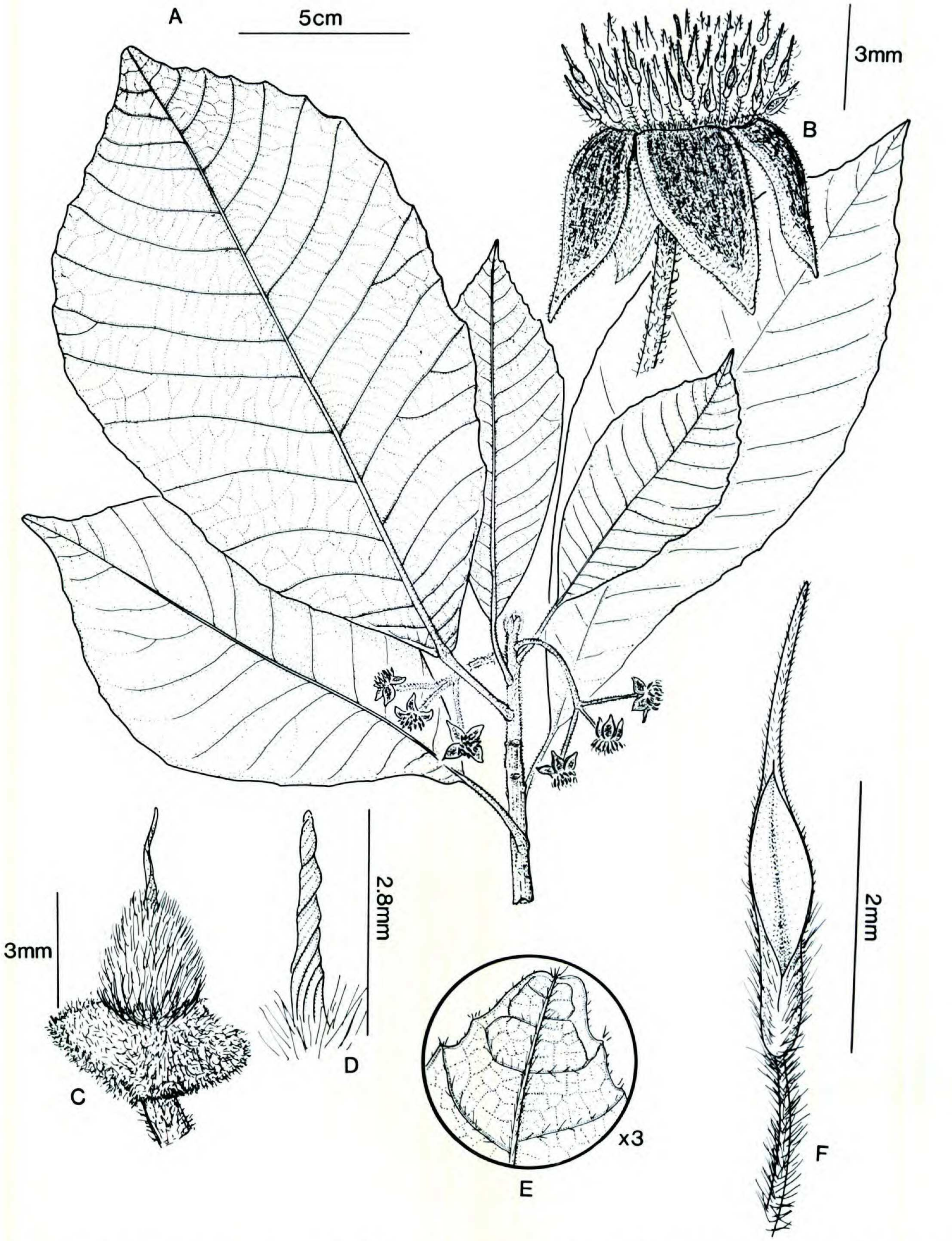


FIGURE 1. Sloanea bolivarensis.—*A. Habit.*—*B. Flower in anthesis.*—*C. Pistil and receptacle.*—*D. Twisted style.*—*E. Leaf blade, detail of apical abaxial side.*—*F. Stamen, laterally dehiscent.*

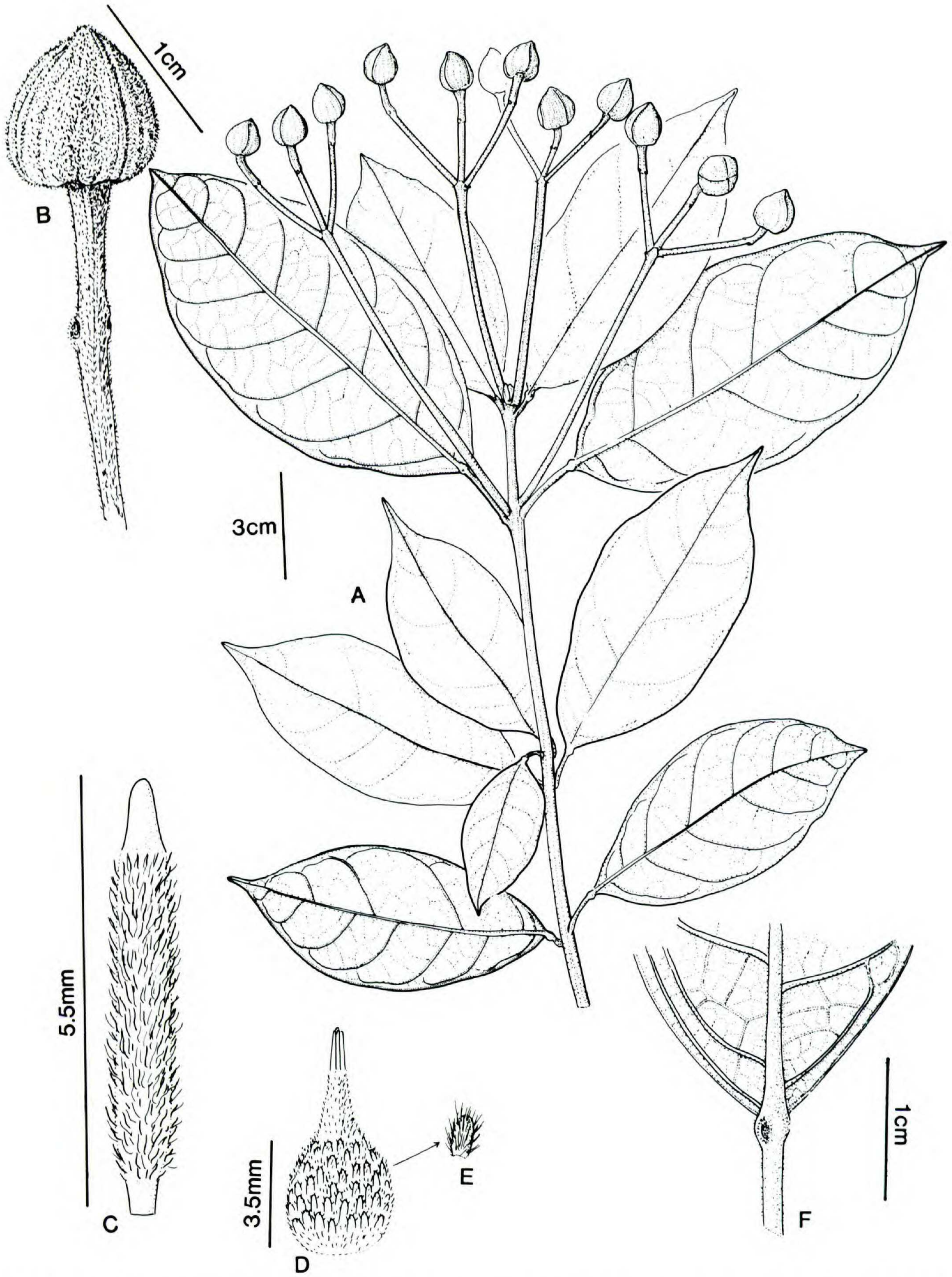


FIGURE 2. Sloanea cataniapensis.—*A. Habit.—B. Flower bud.—C. Stamen.—D. Pistil.—E. One of the hirsutulous appendages of the pistil.—F. Base of leaf blade and portion of petiole, from abaxial side.*

aequalibus 10 mm longis 7.5 mm latis; antheris (alabastro) linearibus 5.5 mm longis dense hirsutulis connectivo in acumen rotundatum glabrum 0.7–1 mm longum productis; filamentis (alabastro) 0.5–0.7 mm longis glabris.

Tree 15 m tall, upper portion of branchlets densely puberulent. Leaves alternate or opposite. Petioles 1–2 cm long, densely fulvous puberulent; leaf blades chartaceous, elliptic-ovate or oblong-elliptic, abruptly acute at apex, acute to subobtuse at base, 7–12.5 cm long, 3.5–6.5 cm wide, entire, glabrous except for the densely minutely puberulent midrib on the lower side; lateral nerves 5–6 each side, elevated below; subsulcate above, ascending at a 45° angle, terminating and anastomosing 1–2 mm from the margin; tertiary venation subelevated reticulate below, subrugulose above. Inflorescence umbellate to paniculate, 3–7-flowered; primary peduncles elongate, 5.5–9 cm long, 2.5–3 mm wide; secondary axes unbranched, 1-flowered, densely fulvous-puberulent; pedicels 2–4 cm long, 1.5–2 mm wide, densely fulvous-puberulent. Flower bud suborbicular, slightly acute at apex, 1 cm long, 1 cm wide basally. Sepals 4, covering the rest of the flowering parts in bud, equal, thickish, with thickened margins, broadly ovate, obtusely acute at apex, 10 mm long, 7.5 mm wide, densely fulvous-puberulent without, sericeous within. Stamens ca. 60; anthers (in bud) linear, 5.5 mm long (including apical appendage), 0.7–0.8 mm wide, densely hirsutulous upward, dehiscent by an apical pore, the connective prolonged into a rounded glabrous awn 0.7–1.1 mm long; filaments (in bud) 0.5–0.7 mm long, glabrous. Ovary broadly ovoid, 3.5 mm long, minutely hispidulous; style conic-linear, 2 mm long, densely hispidulous-appressed in the basal portion, elsewhere glabrous; stamens 4, glabrous.

Related taxa, such as *Sloanea laxiflora* Spruce ex Benth. and *S. synandra* Spruce ex Benth., have branched lateral or secondary axes of the primary peduncles, whereas in *S. cataniapensis* the primary peduncles branch only at their summits into three pedicellate flowers. Other differences are shown by the longer pedicels, shorter filaments, more densely pubescent anthers with longer ascending pubescence, sepals obtusely acute, and more densely puberulous lower midrib of the leaf blade.

Sloanea davidsei Steyermark, sp. nov. TYPE: Venezuela. T. F. Amazonas: Depto. Río Negro, Río Pacimoni, between its mouth and its junction with the Río Baria and Río Yatua, 1°53′–1°27′N, 66°35′–66°32′W, 80 m, 23–25 July 1984, *Gerrit Davidse 27733* (holotype, VEN; isotype, MO). Figure 3.

Arbor 4–15 m, ramulis superne dense patenti-pilosis; foliorum laminis maturis oblongo-obovatis apice rotundatis basi acutis obtusis vel rotundatis 7–14 cm longis (3.5–) 4–9 cm latis integerrimis, costa media nervis lateralibusque pilis patentibus dense munitis, superficie inferiore pilis minutis dense tomentosa; inflorescentiis simplicibus umbellatim 3–4-floris; pedunculis 0.5–3.5 cm longis dense pilosulis; pedicellis (6–)10–20 mm longis dense pilosulis; sepalis quattuor aequalibus late ovatis 5–8 mm longis; antheris 1.5–2 mm longis; connectivo in appendicem hirsutulum 0.7–1 mm longum producto; filamentis 1.2–2.8 mm longis; stylis liberis glabris; capsulis ovoideis 2.2–3 cm longis, spinis setulosis acicularibus inaequalibus majoribus 12–50 mm longis.

Tree 4–15 m tall, upper part of branches minutely and densely pilosulous with spreading hairs. Leaves alternate or opposite. Petioles 1.2–3 cm long, densely tomentose; leaf blades oblong-obovate, rounded at apex, acute, obtuse, or rounded at base, 7–14 cm long, (3.5–)4–9 cm wide, entire; lateral nerves 10–14 each side, elevated below, sulcate above, ascending at a 45° angle, anastomosing at the margins; midrib and lateral nerves below densely pilosulous with spreading hairs; midrib above sulcate, densely tomentellose; lateral nerves above slightly pubescent. Inflorescence lateral or terminal, simply 3–4-umbellately flowered, (2–)4–5.5 cm long; peduncle 0.5–3.5 cm long, densely pilosulous with spreading hairs; bracts at base of pedicels linear-lanceolate, acute, 3.5 mm long, densely tomentose without, sparsely appressed within; pedicels (6–)10–20 mm long, densely pilosulous. Sepals 4, equal, enclosing the flower in preanthesis, ovate, acute, 5–8 mm long, 2.5–5 mm wide, densely cinereous-pubescent without, more sparsely appressed pubescent within, the margins thickened, densely pubescent. Anthers oblong-elliptic or oblong-lanceolate, including the awn 1.5–2 mm long, densely hirsutulous, laterally dehiscent, the connective prolonged into a hirsutulous subobtuse awn 0.7–1 mm long; filaments 1.2–2.8 mm long, equaling or longer than the anther. Ovary ovoid or suborbicular-ovoid, 3.5–4 mm long, 3 mm wide, brown-hispidulous, 4-angled; styles 4, free, divergent, glabrous, 1.5–2 mm long. Capsule ovoid, 2.2–3 cm long, densely covered with usually red, acicular, unequal, straight spines, the longer ones 12–50 mm long with appressed setulose projections along their length, the shorter bristles 3–4 mm long, overlying surface of dense, pale hispidulous hairs; mesocarp reddish. Seed golden, reddish proximally.

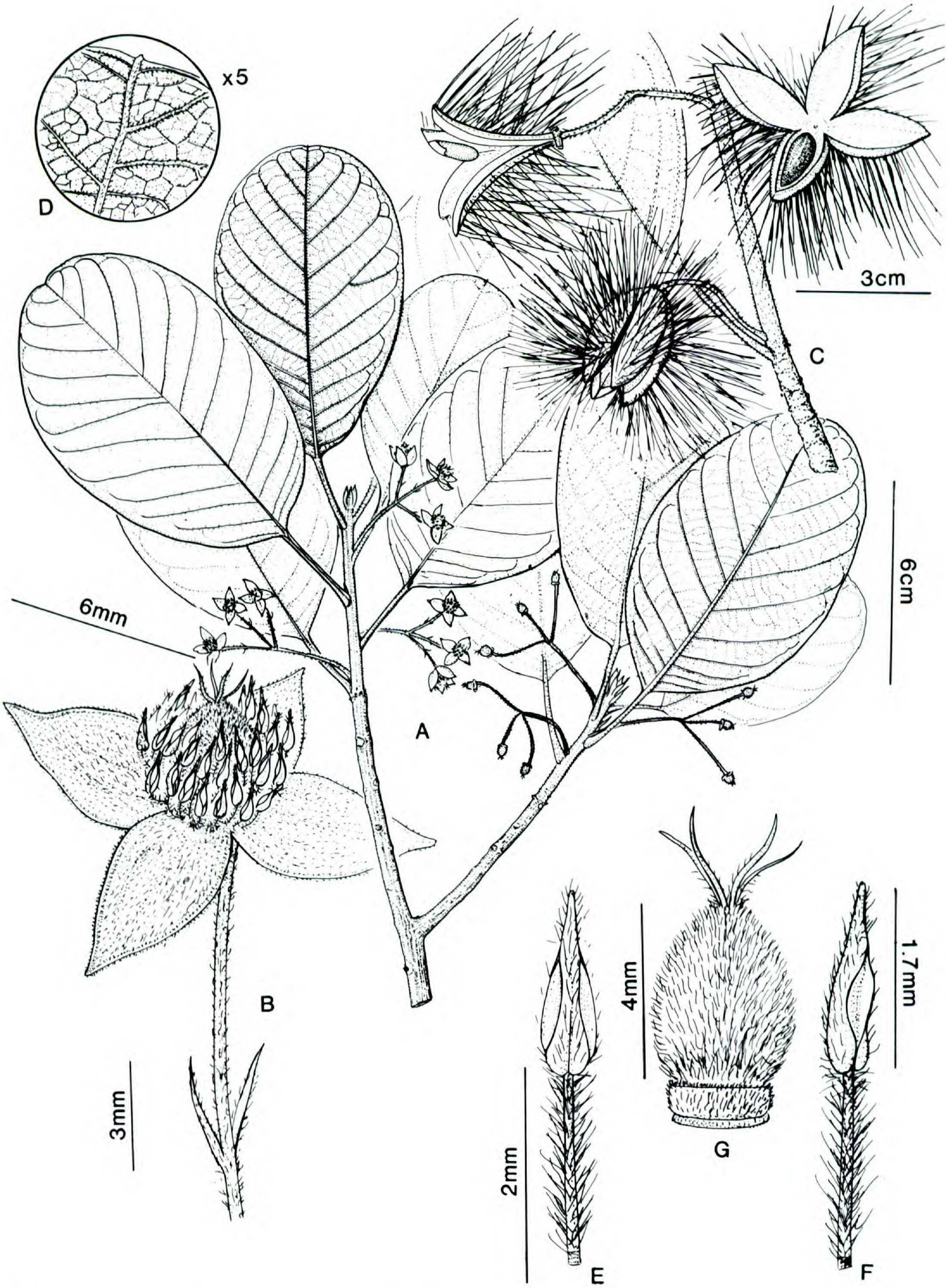


FIGURE 3. Sloanea davidsei.—*A. Habit.—B. Flower and pedicel, in anthesis with bracts.—C. Portion of infructescence.—D. Portion of lower leaf surface.—E. Stamen, with lateral dehiscence, ventral view.—F. Stamen, lateral view.—G. Pistil.*

Paratypes. VENEZUELA. T. F. AMAZONAS: Río Guainía between San Miguel and Maroa, 100–400 m, 30 June 1959, *Wurdack & Adderley 43260* (MO, NY); DEPT. RÍO NEGRO: selva pluvial por las orillas del Medio Pacimoni, 1°40′N, 66°35′W, 3 Dec. 1984, *Stergios & Aymard 7582, 7583* (MO, PORT); 0.5 km N of mouth of Río Casiquiare, 1°57′N, 67°7′W, 5 Feb. 1980, *Liesner & Clark 9140* (MO, VEN); igapó forests along Caño Cuweje, 32 km S of San Carlos, 1°56′N, 67°03′W, 119 m, 4 Apr. 1980, *Clark 7480* (MO); laja on right bank of Caño Cupueni, opposite mouth of Río Atabapo, 120–130 m, 12 Nov. 1953, *Maguire, Wurdack & Bunting 36219* (MO, NY).

Common names. Uruch, onoto rebalsero; onotillo, urucurana.

The common names are derived from the superficial resemblance to the spinose fruits of *Bixa orellana* and *B. urucurana*. The species is related to *Sloanea kuhlmanii* Ducke of Amazonian Brazil but differs in the absence of a corrugated receptacle, in the shorter stamens with densely hirsutulous anthers and their appendages, in the entire leaf margins nonemarginate at the apex, in the densely pubescent peduncles and pedicels, and in the densely pubescent lower leaf surfaces, especially on the nerves. The younger leaves of *Davidse 27733* and *Wurdack & Adderley 43260* have a more abundant tomentum on the lower leaf surface. The pubescence of the older, more mature leaf blades tends to be more sparse and shortly ascending or spreading along the midrib and/or nerves, whereas the lower surface itself, including the tertiary veins, remains glabrous or essentially so.

Sloanea longiaristata Steyerm., sp. nov. TYPE: Venezuela. T. F. Amazonas: Depto. Atabapo, forested slopes, Cerro Marahuaca, 1–2 km N of Sima Camp, 3°43′N, 65°31′W, 1,100 m, 8–9 Mar. 1985, *Ronald Liesner 18455* (holotype, VEN; isotype, MO). Figure 4.

Arbor 5–15 m, ramulis juvenilibus tomentosis; petiolis 0.7–2 cm longis dense tomentosis; foliorum laminis late oblongo-obovatis vel elliptico-oblongis apice rotundatis vel breviter obtusis basi acutis vel subacutis 10–15 cm longis 5–11 cm latis praeter utrinque costam mediam nervos lateralesque tomentosis glabris integris vel subundulatis; inflorescentiis lateralibus racemosis 1.5–4.5 cm longis 3–8-floris dense hirtellis pilis patentibus munitis; pedunculis 5–7 mm longis dense hirsutulis; pedicellis 4–15 mm longis dense hirsutulis pilis patentibus munitis; sepalis quattuor reflexis lanceolatis acutis 2.5–4 mm longis, utrinque hirsutulis; antheris elliptico- vel ovoideo-oblongis 0.7–1 mm longis dense hirsutulis lateraliter dehiscentibus; connectivo in aristam glabram elongatam 1.3–2 mm longam producto; filamentis 1.5–2.1 mm longis dense hirsutulis; stylis quadripartitis vel basi vix connatis 2.8–4 mm longis praeter basim adpresso-hispidulam glabris; capsulis ignotis.

Tree 5–15 m high, the young branches tomentose. Leaves alternate, crowded at the summit of the branches. Petioles 0.7–2 cm long, densely tomentose; leaf blades coriaceous, broadly oblong-obovate or elliptic-oblong, rounded at summit, or with a short broadly obtuse projection, cuneately acute or subacute at base, 10–15 cm long, 5–11 cm wide, the leaf surfaces glabrous, but the upper and lower midribs tomentose and the lower lateral nerves slightly pubescent, the margins entire to subundulate; lateral nerves 6–8 each side, elevated below, slightly impressed above, ascending at 45–60°, terminating mainly at the margins or unbranched before reaching margins; tertiary venation forming obliquely parallel connecting veins with the lateral nerves of the lower side, slightly elevated or impressed below. Inflorescence lateral, racemose, 1.5–4.5 cm long, 2.5 cm wide, 3–8-flowered, rachis moderately hirtellous with spreading hairs. Peduncles 5–7 mm long, densely hirsutulous. Bracts subtending pedicels, alternate, linear, 2 mm long, densely hirtellous. Pedicels 4–15 mm long, densely hirsutulous with spreading hairs. Sepals 4, reflexed, lanceolate, acute, 2.5–4 mm long, densely hirsutulous without, less pubescent within. Anthers elliptic or ovoid-oblong, 0.7–1 mm long, densely hirsutulous, laterally dehiscent, the connective prolonged into a conspicuously elongated glabrous awn 1.3–2 mm long; filaments 1.5–2.1 mm long, densely hirsutulous, much exceeding the anther body. Ovary ovoid-subglobose or ovoid-oblong, 3–3.5 mm long, 2–2.5 mm wide, densely hispidulous; styles 4, deeply divided or connate at the base, 2.8–4 mm long, glabrous except in the appressed-pubescent basal portion. Young capsule 4-celled.

Paratypes. VENEZUELA. T. F. AMAZONAS: 1–2 km SE and E of San Carlos, 20 km S of confluence of Río Negro and Brazo Casiquiare, 1°56′N, 67°3′W, 120 m, 22 Apr. 1979, *Liesner 6875* (MO, VEN). DEPT. ATABAPO: Cerro Marahuaca, Sima Camp, S-central portion of forested slopes along E branch of Caño Negro, 3°43′N, 65°31′W, 1,140 m, 21–22 Feb. 1985, *Steyermark & Holst 130507* (MO, VEN).

This species is most closely related to *Sloanea duckei* C. E. Smith and *S. rufa* Planch. ex Benth. From *S. rufa* it differs in the longer anthers and longer awns, more elongated inflorescences and pedicels, broadly rounded leaf apices, glabrous lower leaf surface, and styles more divided. From *S. duckei* it differs in the longer awns; longer filaments; pubescent petioles, midribs, and secondary nerves of the leaf blades; broadly obovate or oblong-obovate leaf blades acute or subacute at base; shorter peduncles; and 4 instead of 5–7 sepals. From

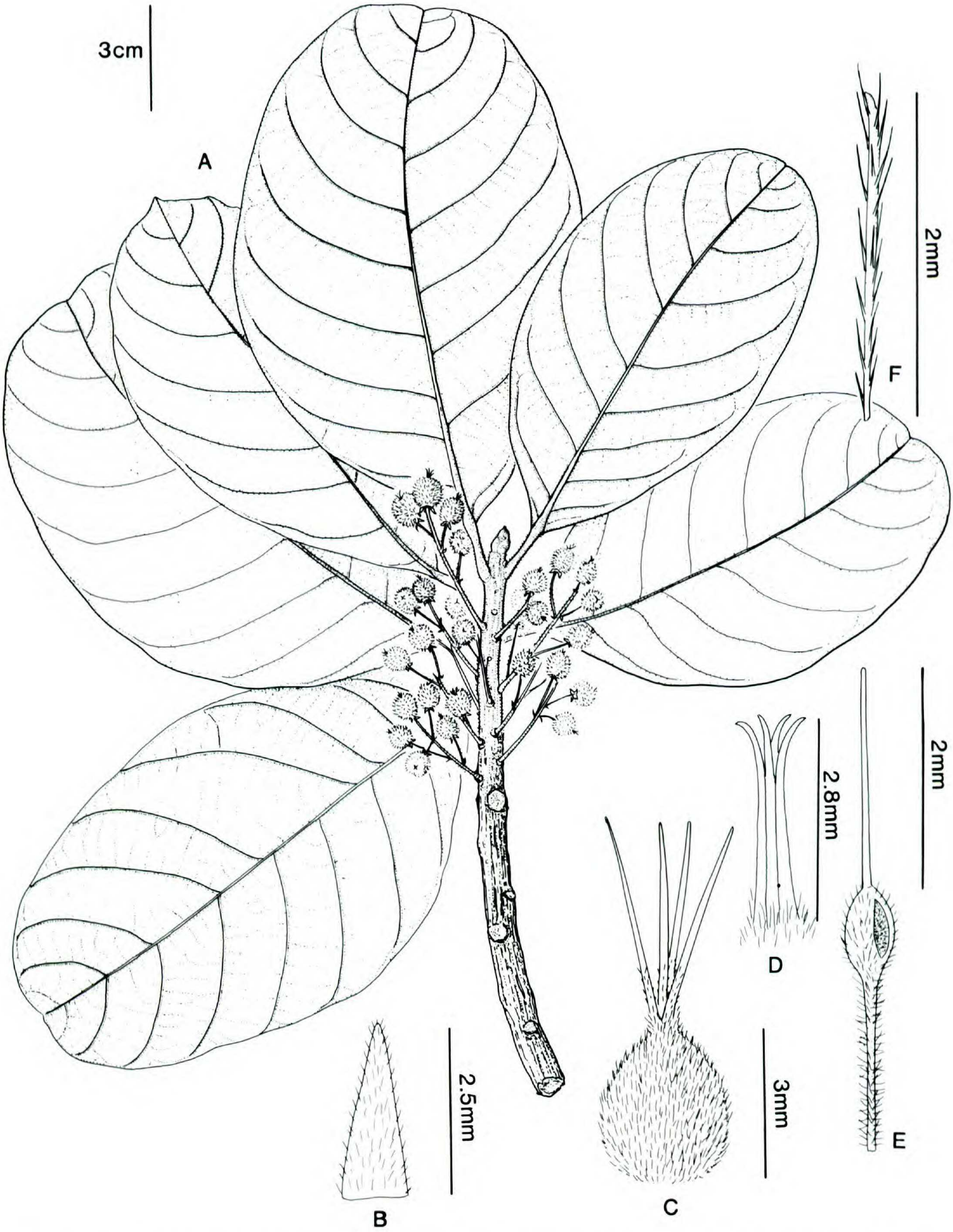


FIGURE 4. Sloanea longiaristata.—*A. Habit.*—*B. Sepal, exterior view.*—*C. Pistil, showing free styles.*—*D. Pistil, showing coherent styles.*—*E. Stamen.*—*F. Portion of bristly hairs of young fruit.*

other related species belonging to section *Brevispicae* C. E. Smith, such as *S. stipitata* Spruce ex Benth. and *S. robusta* Uittien, it is distinguished by the elongate awns longer than the anther body, shorter petioles, and differences in the leaf blades.

The collection *Liesner 6875* from the region of San Carlos is doubtfully assigned to this taxon. It differs in having the styles more united and smaller, glabrous leaf blades with the apices more obtusely prolonged rather than rounded and with more-undulate margins.

Sloanea merevariensis Pittier ex Steyerm., sp. nov. TYPE: Venezuela. Bolívar: Alto Río Guaña (Merevari) near Brazil frontier, without date, *Felix Cardona 1051* (also numbered *1053, 1055*) (holotype, F; isotypes, US, VEN). Figure 5.

Arbor; ramulis minute pubescentibus; petiolis 2.5–3.3 cm longis, minute adpresso-puberulentibus; foliorum laminis obovatis apice rotundatis basi acutis 8.5–13 cm longis 4–6.5 cm latis, costa media supra dense tomentosa, subtus pilosula pilis laxis munita; nervis lateralibus subtus puberulis pilis patentibus praeditis; nervis lateralibus utroque latere 9–10; inflorescentiis umbellatis vel corymboso-racemosis 3–5-floris; pedunculis 6–7 mm longis moderate adpresso-puberulentibus; pedicellis 7–8 mm longis moderate adpresso-puberulentibus; sepalis quattuor reflexis ovatis acutis 4–4.5 mm longis; antheris 1.5–1.6 mm longis hispidulis lateraliter dehiscentibus, connectivo in acumen late lanceolatum acutum 0.3–0.4 mm longum producto; filamentis 2 mm longis pilosulis; stylis quadripartitis erectis supra medium glabris infra medium minute puberulis. Capsula ignota.

Tree with minutely pubescent branches. Leaves alternate. Petioles 2.5–3.3 cm long, minutely appressed-puberulent except on the more densely pubescent canaliculate upper side; leaf blades obovate, rounded at apex, acute at base, 8.5–13 cm long, 4–6.5 cm wide, glabrous on the upper and lower surfaces except densely tomentose above on the slightly sulcate midrib, this moderately laxly pilose below and laxly puberulous on lower lateral nerves, the nerves 9–10 each side, ascending at 45–50° and anastomosing 3–5 mm from margins; tertiary venation minutely reticulate, elevated both sides, with subparallel obliquely transverse connections with the lateral nerves. Inflorescence lateral and terminal, umbellate or corymbose-racemose with 3–5 flowers. Peduncles 6–7 mm long, moderately appressed-puberulent; pedicels 7–8 mm long, moderately puberulent. Sepals 4, reflexed, dark in drying, subequal, 4–4.5 mm long, 3–3.5 mm wide at base, moderately pubescent without, sparsely appressed pubescent within, the margins pubescent. Anthers lance-elliptic, 1.5–1.6 mm long, hispidulous, laterally dehiscent, the connective prolonged into a short lanceolate, subacute, minutely puberulent awn 0.3–0.4 mm long; filaments 2 mm long, pilosulous. Ovary subglobose, 0.7 mm long; styles 4-parted, erect, 1.5 mm long, minutely puberulous in lower half, glabrous above. Capsule unknown.

This species was distributed by C. E. Smith as *Sloanea laurifolia* (Benth.) Benth. As indicated in another part of the text, *S. laurifolia* is treated by the present author as having less variability than that allowed by Smith. *Sloanea merevariensis* may be differentiated by the obovate, rounded leaf blades having the upper midrib densely tomentose.

Sloanea parvifructa Steyerm., sp. nov. TYPE: Brazil (near Venezuelan border). Serra da Neblina, Rio Negro, Rio Cauaburi, Rio Maturacá, between Missão Salesiana and Serra Pirapucú, 800–1,000 m, 23 Jan. 1966, *Nilo T. Silva & Umbelino Brazão 60865* (holotype, MO; isotype, NY).

Arbor 10 m, ramulis prope apicem dense minuteque pubescentibus; petiolis 1.5–2.7 cm longis minute puberulentibus; foliorum laminis obovato-spathulatis, apice rotundatis vel late obtusis, basi acutis 13–19 cm longis, 4.5–7 cm latis obscure repandis vel integris praeter costam medium sparsim puberulam utrinque glabris; nervis lateralibus utroque latere 7–8; floribus non visis; infructescentiis lateralibus racemosis 4–5-fructus gerentibus 3–3.5 cm longis; pedunculis 5–9 cm longis; pedicellis fructiferis 8–10 mm longis dense puberulis; capsulis parvis, valvulis 9–10 mm longis 7 mm latis, tenuibus, spinis tenuibus 1.5–3 mm longis antrorse pubescentibus.

Tree 10 m tall, the branches minutely pubescent toward the summit. Leaves alternate. Petioles 1.5–2.7 cm long, densely minutely puberulent; leaf blades obovate-spathulate, rounded or broadly obtuse at apex, narrowed at the acute base, 13–19 cm long, 4.5–7 cm wide, obscurely repand or entire, except for the sparsely pubescent upper and lower midribs, glabrous on both surfaces; lateral nerves 7–8 on each side, ascending at 50–60°. Flowers not seen. Infructescence lateral, racemose, bearing 4–5 fruits, the fruiting axes 3–3.5 cm long, 1.5 mm wide, widely spreading from stem, densely puberulous with spreading-ascending trichomes; peduncle 5–9 mm long; fruiting pedicels slender, 8–10 mm long, densely puberulous with spreading-ascending hairs. Capsules relatively small, the valves 9–10 mm long, 7 mm wide; bristles slender, purple, 1.5–3 mm long, antrorsely pubescent. Seeds oblong, 7 mm long, 4.5 mm wide.

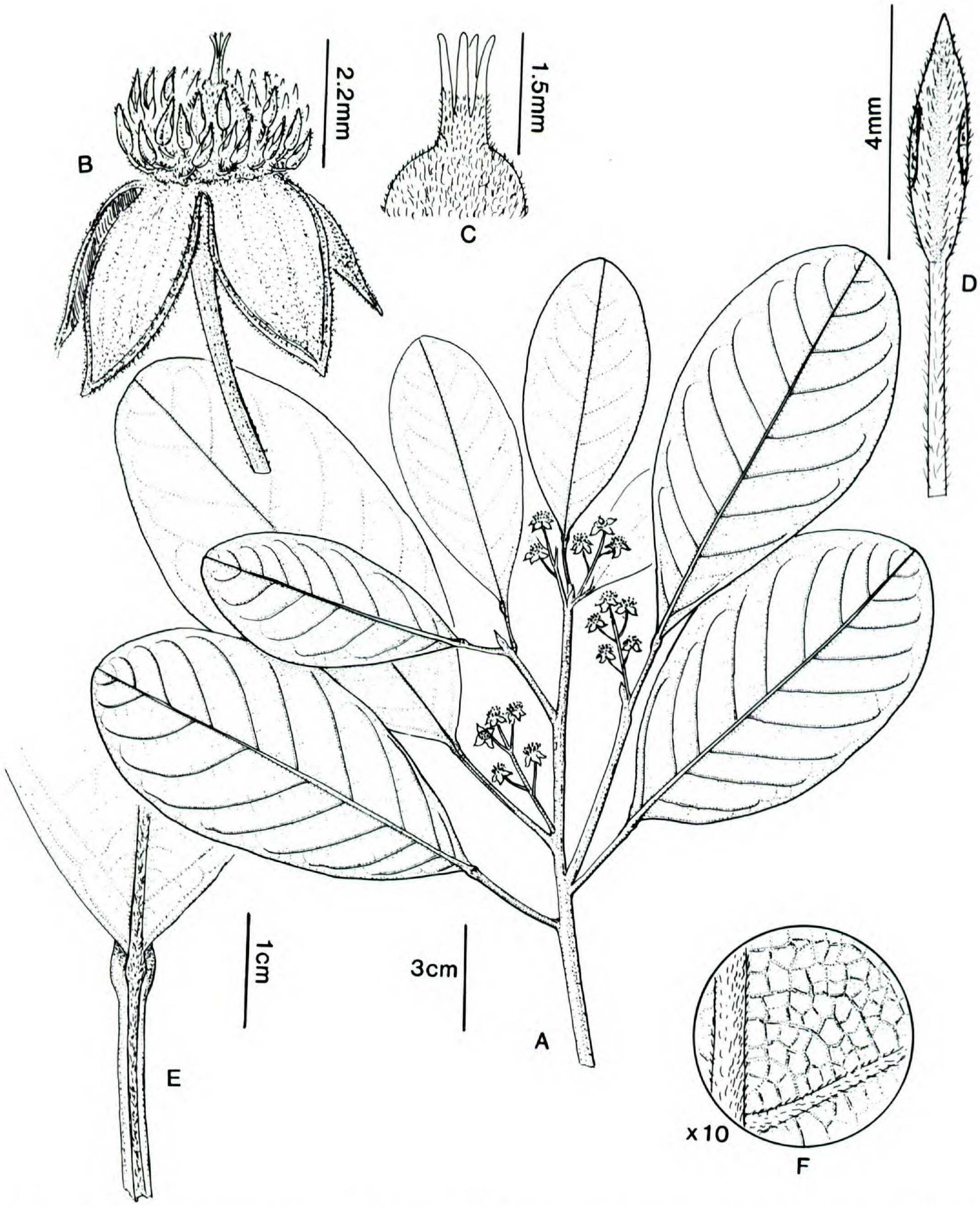


FIGURE 5. Sloanea merevariensis.—*A. Habit.*—*B. Flower, at anthesis.*—*C. Pistil.*—*D. Stamen.*—*E. Base of leaf blade, adaxial view, with petiole.*—*F. Lower portion of leaf blade.*

From the related *Sloanea duckei* C. E. Smith of Amazonian Brazil, the new species differs in having densely puberulent petioles, a puberulous lower midrib, and lateral nerves ascending at a greater angle. From *S. spathulata* C. E. Smith of Territorio Acre, Brazil, it differs by having longer infructescences with longer pedicels, much shorter bristles, shorter petioles, more strongly ascending lateral nerves, and obliquely transversely connecting tertiary nerves straighter, less branched, and less prominent.

Sloanea sipapoana Steyerm., sp. nov. TYPE: Venezuela. T. F. Amazonas: Cerro Sipapo (Pa-

ráque), Camp Savanna, 1,500 m, 15 Dec. 1948, *Bassett Maguire & Louis Politi 27674* (holotype, MO; isotype, NY). Figure 6.

Arbor ad 15 m alta ubique plerumque glabra, foliis alternis; petiolis 0.9–1.5 cm longis; foliorum laminis coriaceis lanceolatis vel lanceolato-ellipticis apice acutate acuminatis basi obtusis vel subacutis majoribus 8.5–13.5 cm longis 2.5–5 cm latis integerrimis; costa media supra elevata; nervis lateralibus supra vix manifestis subtus paullo elevatis utroque latere 11–13; venatione tertiaria subtus subtiliter reticulata; infructescentia laterali; pedunculo 2.5–3.5 cm longo glabro; pedicellis 1.5–2 cm longis glabris vel sparsim puberulentibus; capsulis inermibus 2–2.5 cm longis minute puberulentibus.

Tree to 15 m tall with glabrous branches. Leaves alternate, glabrous throughout. Petioles 0.9–1.5 cm long; leaf blades coriaceous, lanceolate or lance-elliptic, slenderly acutely acuminate at apex, obtuse to subacute at base, the large ones 8.5–13.5 cm long, 2.5–5 cm wide, entire; midrib elevated above and below; lateral nerves 11–13 each side, ascending at 25–35°, not reaching margin, scarcely evident above, slightly elevated below, anastomosing with tertiary venation 2–7 mm from margin; tertiary venation finely reticulate on lower surface, scarcely evident on upper surface. Infructescence lateral. Peduncle 2.5–3.5 cm long, 1–1.5 mm diam., glabrous. Pedicels 1.5–2 cm long, glabrous to sparsely puberulent. Capsules unarmed, 4-valved, 2–2.5 cm long, the surface densely and minutely puberulent. Seed oblong, 1.1 cm long, 0.8 cm wide.

Paratype. VENEZUELA. T. F. AMAZONAS: Cerro Sipapo (Paráque), upper Caño Negro and right branch (north) of Caño Profundo, 1,455 m, 10 Jan. 1949, *Maguire & Politi 28266-A* (MO, NY).

Apparently a member of section 4, *Corymbo-Racemi* C. E. Smith, most closely related to *Sloanea oppositifolia* Spruce ex Benth. (= *S. laurifolia* (Benth.) Benth.), from which the new species differs in the alternate, coriaceous leaf blades with an elevated midrib, inconspicuous lateral nerves, and finely reticulate tertiary venation of the lower surface.

Sloanea steyermarkii C. E. Smith

Sloanea steyermarkii C. E. Smith, described from a collection taken from the summit of Auyan-tepui, a massive sandstone table mountain of the Venezualan Guayana, appeared to be a distinct, isolated endemic species, characterized by the dense, congested, subsessile inflorescence; coriaceous, rugose leaf blades rounded at the apex; densely buff- or ferruginous-tawny tomentose lower leaf surfaces with the tomentum completely covering the midrib, nerves, and lower surface; and small, densely bristly fruits with bristles 2–4 mm long.

Additional collections obtained from the summits of various other sandstone table mountains throughout the Venezuelan Guayana have similar patterns of leaf size, shape, rounded apex, congested inflorescences, and small fruits with short bristles but differ chiefly in the density of the pubescence on the lower leaf surface. In typical *Sloanea steyermarkii*, known from the mountains situated within the eastern drainage of the Río Caroní and its tributaries (Ptari-tepui, Chimantá-tepui, Auyan-tepui, and Uaipán-tepui of Estado Bolívar), most or all of the leaves retain dense abaxial tomentum. However, a specimen collected from Uaipán-tepui (*Koyama & Agostini 7185*) has only the youngest leaves with a dense buff tomentum completely covering the lower surface, whereas the older ones have lost most of the dense tomentum and retain only mere traces on the lower surface and along the midrib and nerves.

Westward on the summits of the sandstone mountains, beginning with the western drainage of the Río Paragua of Cerro Guaiquinima and the Río Caura of Cerro Guanacoco and the Meseta del Jaua, the indument of the lower surface is less prominent and is manifested only by pale sparse puberulence along the midrib and some of the lateral nerves. This tendency toward glabrity continues westward on the summits of the sandstone mountains of the Territorio Federal Amazonas (Cerro Huachamacari, Yapacana, Aracamuni, Autana, and Sipapo). The taxa that have previously been treated as species, *Sloanea autanae* from Cerro Autana, *S. yapacanae* from Cerro Yapacana, and *S. jauaensis* (including var. *minor*) from the Meseta del Jaua, are best treated by recognizing subspecies with glabrous or glabrate leaf variations of a more widely ranging *S. steyermarkii* geographically isolated in the western portion of the Guayana Highland.

KEY TO THE SUBSPECIES OF *SLOANEA STEYERMARKII*

1a. Lower leaf surface chiefly densely tomentose beneath, at least on the younger leaves, completely covering the surface and nerves with a dense buff- or ferruginous-tawny tomentum; plants of Ptari-tepui westward to Chimantá Massif and Auyan-tepui, Edo. Bolívar ..... *S. steyermarkii* subsp. *steyermarkii*

1b. Lower leaf surface glabrous or with a minute scattered pubescence; lower midrib and/or lateral nerves more or less puberulent to glabrous 2

2a. Leaf blades entire, mainly rounded or

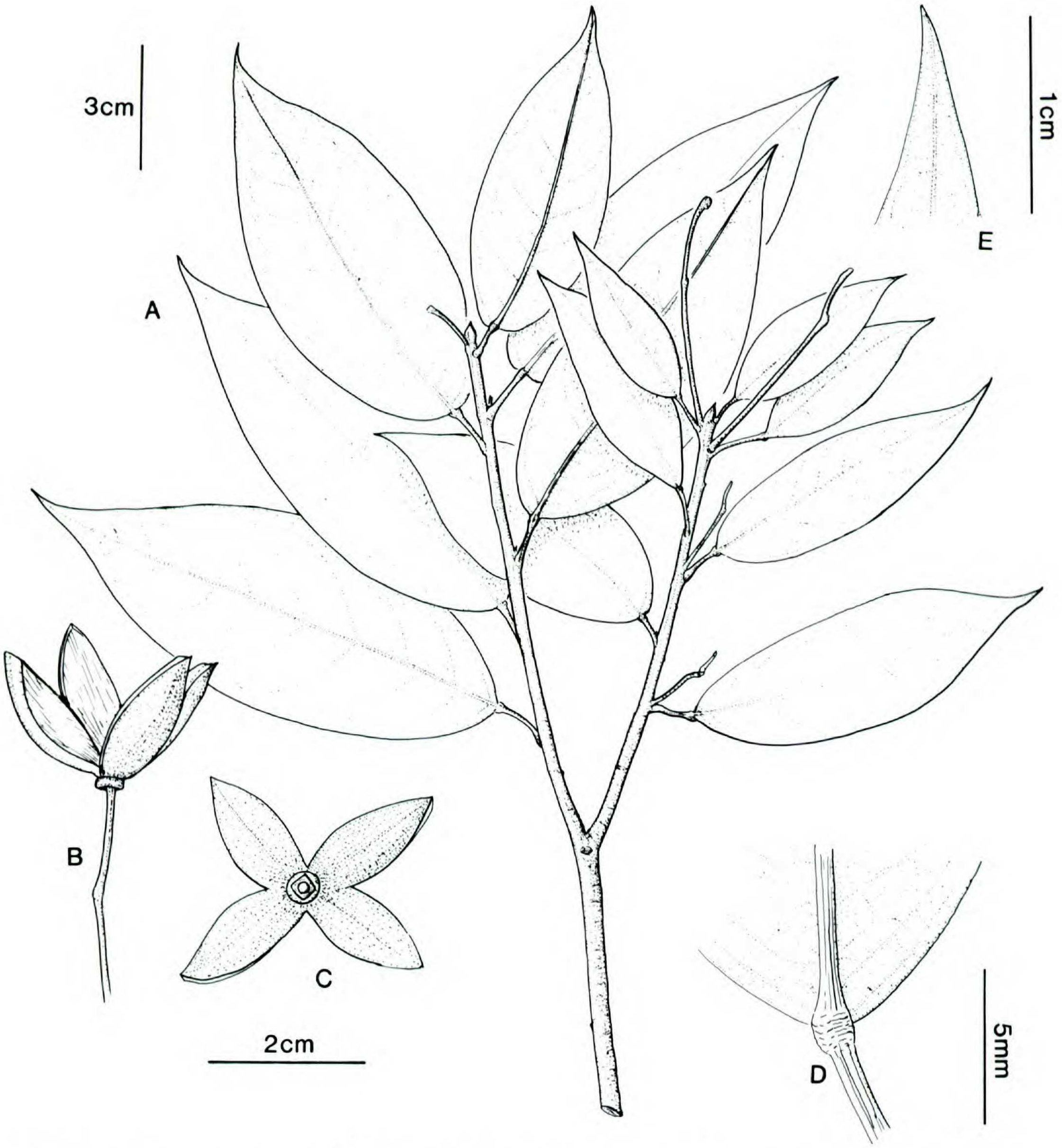


FIGURE 6. Sloanea sipapoana.—*A. Habit.*—*B. Capsule, lateral view, dehiscing.*—*C. Capsule, ventral view.*—*D. Leaf base, with portion of petiole, abaxial view.*—*E. Leaf blade showing apex, adaxial view.*

broadly obtuse at the apex ..... *S. steyermarkii* subsp. *jauaensis*

2b. Leaf blades undulate-repand, often narrowed to a less obtuse apex ..... *S. steyermarkii* subsp. *autanae*

Sloanea steyermarkii C. E. Smith subsp. **jauaensis** (Steyerm.) Steyerm., stat. nov. *Sloanea jauaensis* Steyerm., Bol. Soc. Venez. Ci. Nat. 33(132–133): 353. 1976.

Sloanea jauaensis Steyerm. var. *minor*, Bol. Soc. Venez. Ci. Nat. 33(132–133): 354. 1976.

Sloanea yapacanae Steyerm., Pittieria No. 7: 15. 1978.

Specimens examined. VENEZUELA. BOLÍVAR: Meseta del Jaua, Cerro Jaua, 4°48′50″N, 64°34′10″W, porción sur-oeste, 1,810–1,880 m, *Steyermark et al. 109841* (type of *Sloanea jauaensis*, VEN); Meseta del Jaua, Cerro Jaua, 4°48′50″N, 64°34′10″W, porción sur-oeste, 1,810–1,880 m, *Steyermark et al. 109695* (type of *S. jauaensis* var. *minor*, VEN); Cerro Guaiquinima, Río Paragua, below SE escarpment, 1,600–1,700 m, *Maguire 33029* (NY); Cerro Guanacoco, 4°46′30″N, 63°55′5″W, 1,450 m, *Steyermark et al. 109760* (NY, VEN). T. F. AMAZONAS: Cerro Huachamacari, Summit Camp, 1,800 m, *Maguire et al. 30088, 30097* (MO, NY); Cerro Yapacana, 3°45′N, 66°45′W, 1,000–1,200 m, *Steyermark & Bunting 103186* (type of *S. yapacanae*, VEN); Cerro Yapacana, 1,200 m, *Maguire et al. 30737* (NY); Cerro Sipapo, S basin, 1,835 m, *Maguire & Politi 28684* (NY).

A sterile collection from the summit of Cerro Aracamuni (*Liesner & Carnevali 22722*) probably is to be referred to this subspecies.

Sloanea steyermarkii C. E. Smith subsp. **autanae** (Steyerm.) Steyerm., stat. nov. *Sloanea autanae* Steyerm., Pittieria 7: 13. 1978.

Specimens examined. VENEZUELA. T. F. AMAZONAS: Cerro Autana, 4°52′N, 67°27′W, 1,230–1,270 m, *Steyermark 105222* (type of *S. autanae*, VEN).

Sloanea subpsilocarpa Steyerm., sp. nov. TYPE: Venezuela. T. F. Delta Amacuro: bosque pluvial, E de Río Grande, ENE El Palmar, near limits of Edo. Bolívar, 29 Nov.–18 Dec. 1964, *Luis Marcano-Berti 447* (holotype, VEN; isotypes, MO, NY). Figure 7.

Arbor 28–30 m; petiolis 0.6–3 cm longis; foliorum laminis oblongis vel oblongo-ellipticis apice obtuse acutis obtusis vel raro rotundatis basi obtusis vel rotundatis 8–16 cm longis 4–7 cm latis integerrimis ubique glabris; nervis lateralibus utroque latere 4–6(–8); venatione tertiaria supra prominente reticulata; inflorescentia (post anthesim) subpaniculata 2–5-flora; pedunculis 1.5–2 cm longis tomentellis; pedicellis post anthesin 1–2 cm longis fructiferis 2–2.5 cm longis tomentellis; sepalis quattuor coriaceis late ovatis acutis dense fulvo-tomentellis 10–13 cm longis 9 mm latis; antheris 2 mm longis adpresso-pubescentibus prope poros sub apicales lateraliter dehiscentibus, connectivo in acumen lanceolatum obtusum glabrum 1.5 mm longum producto; filamentis 0.5–1 mm longis sparsim adpresso-pubescentibus vel glabris; ovario 5 mm longo dense fulvo-tomentoso; stylis 2 mm longis fulvo-strigillosis; capsulis inermibus vel sparsim breviter tuberculatis subglobosis 4.5 × 4.5 cm.

Trees 28–30 m tall. Leaves alternate. Petioles 0.6–3 cm long; leaf blades oblong or oblong-elliptic, acute or obtuse, rarely rounded at apex, obtuse or rounded at base, 8–16 cm long, 4–7 cm wide, entire, glabrous both sides; midrib sulcate above, elevated below; lateral nerves 4–6(–8) each side, impressed above, elevated below, branching and anastomosing 4–9 mm from the margins, ascending at 50–60°; tertiary venation prominently reticulate and subelevated above, reticulate and subelevated below. Inflorescence (past flowering) subpaniculate, terminal or lateral, 2–5-flowered; peduncles (past flowering) 1.5–2 cm long, 1.5 mm wide, 2–2.5 cm long (fruiting), brown-tomentose; bracts ovate, acute, 4–5 mm long, tomentellous on both sides; pedicels (past flowering) 1–2 cm long, 2–2.5 cm long, 3–3.5 mm wide (fruiting); sepals 4, coriaceous, persistent, broadly ovate, acute, 10–13 mm long, 9 mm wide at base, inner surface blackish, sparsely pubescent basally, densely brown-tomentellous without. Anthers 2 mm long, 0.7–0.8 mm wide, appressed-pubescent, dehiscing laterally by subapical pores, the connective prolonged into a glabrous, lanceolate, obtuse awn 1.5 mm long; filaments shorter than and about width of anther, blackish, 0.5–1 mm long, 0.5 mm wide, sparsely appressed to glabrous. Ovary subglobose-ovoid, 5 mm long, 5 mm wide, obtusely angled, densely brown-tomentose; styles 2 mm long, densely brown strigillose. Fruit unarmed or with a few scattered short, obtuse, glabrous tubercles 0.5–1 mm long on a surface covered with dense brown tomentum intermixed with minute white hairs 0.1–0.2 mm long, subglobose, 4.5 × 4.5 cm; mesocarp ligneous, 6–8 mm thick.

Paratypes. VENEZUELA. T. F. DELTA AMACURO: E de Río Grande, ENE of El Palmar, near limits of Edo. Bolívar, 29 June 1964, *Marcano-Berti 275* (MO, NY, VEN); same locality, *Marcano-Berti 437* (MO, NY, VEN). BOLÍVAR: campamento "El Paraiso" y "La Yagua," a 48 km NE del caserío Los Rosos, este último a 17 km de Upata (sobre la carretera nueva Upata–San Felix), 9 Sep. 1966, *Blanco 578* (VEN).

Common name. Almidon.

This species has been confused with *Sloanea laurifolia* (Benth.) Benth., from which it differs in the larger, thicker sepals, pubescent anthers with a longer, lanceolate awn, subpaniculate inflorescence, larger bracts, and stouter peduncle and pedicels. From *S. latifolia* (Rich.) Schum. (*S. inermis* Ducke) *S. psilocarpa* is distinguished by the shorter stamens with pubescent anthers; larger fruits with shorter, obtuse, glabrous tubercles; broadly ovate sepals broader at the base; and usually obtuse to rounded leaf bases.

Sloanea wurdackii Steyerm., sp. nov. TYPE: Venezuela. Bolívar: Río Parguaza, just below Raudal Maraca (ca. 110 km above river mouth), 115 m, 30 Dec. 1955, *John Wurdack & Joseph Monachino 41017* (holotype, MO; isotype, NY). Figure 8.

Arbor 6–20 m; petiolis 3.5–10 cm longis sparsim puberulentibus admodum glabris; foliorum laminis late oblongo-ovatis apice rotundatis basi subacutis vel rotundatis majoribus 18–25 cm longis 9.5–15 cm latis integerrimis admodum glabris; nervis lateralibus utroque latere 10–12; inflorescentiis elongatis duobus vel tribus simul laxe racemosis vel subpaniculatis 4–8.5 cm longis 2–5-floris, rhachidi glabra vel sparsim puberulenti; pedicellis elongatis apice recurvatis 1–4 cm longis minute puberulentibus; sepalis post anthesim valde reflexis lanceolatis 2.5 mm longis; antheris 0.9–1 mm longis dense adpresso-pubescentibus prope apicem dehiscentibus, connectivo in acumen acutate obtusum pubescentem 0.1–0.2 mm longum producto; filamentis 2 mm longis dense adpresso-pubescentibus; fructu immaturo oblongo 1.5–1.7 cm longo praeter partem basalem 3–4 mm longam inaequaliter spinosis, spinis rigidis 2–3 mm longis.

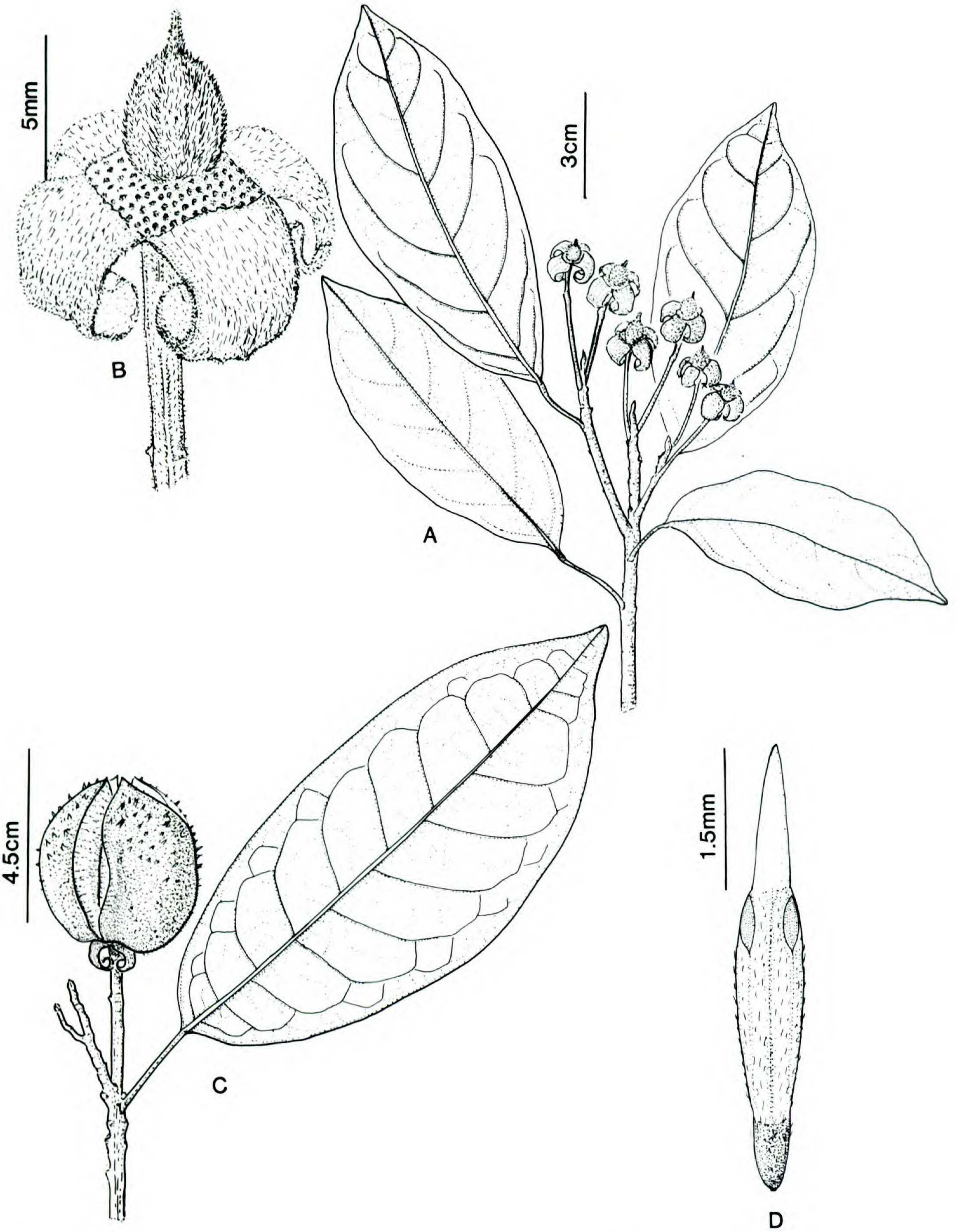


FIGURE 7. Sloanea subpsilocarpa.—*A. Habit.—B. Flower, post anthesis with reflexed sepals.—C. Portion of fruiting branch.—D. Stamen.*

Tree 6–20 m tall. Branches glabrous. Leaves alternate. Petioles 3.5–10 cm long, essentially glabrous but sparsely microscopically puberulent; leaf blades broadly oblong-ovate, rounded at the sometimes mucronate summit, subacute to rounded at base, the larger ones 18–25 cm long, 9.5–15 cm wide, entire or subentire, glabrous both sides; midrib essentially glabrous below but with traces of minute puberulence, prominently elevated; lateral nerves 10–12 each side, ascending at 60–70°,

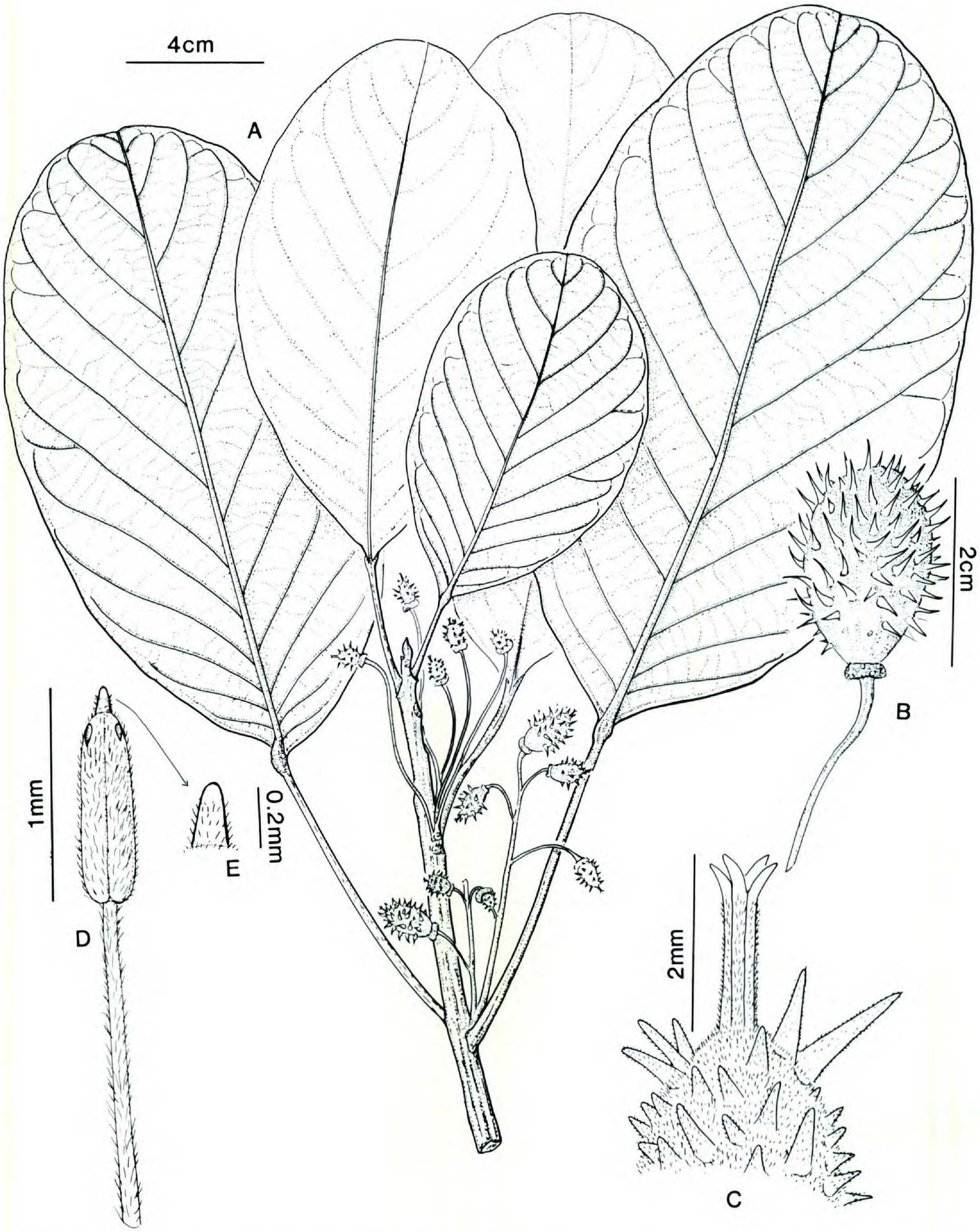


FIGURE 8. Sloanea wurdackii.—*A. Habit.—B. Capsule with pedicel.—C. Pistil.—D. Stamen.—E. Apical connective of anther.*

anastomosing 2–7 mm from the margin, elevated below, impressed above; tertiary venation minutely reticulate, slightly elevated above. Inflorescences elongated, subpaniculate or laxly racemose, 2–3 together, 4–8.5 cm long, 2–5-flowered, the rachis glabrous or minutely sparsely puberulent; pedicels elongated, recurved at apex, 1–4 cm long, the lowest 3.5–4 cm long, minutely puberulent. Sepals strongly reflexed after flowering, lanceolate, 2.5 mm long, 0.7–1 mm wide at base, minutely appressed-pubescent both sides. Anthers linear-lanceolate, 0.9–1 mm long, densely appressed-pu-

bescent, dehiscent near the apex, connective prolonged into a short acutely obtuse pubescent knob 0.1–0.2 mm long; filaments 2 mm long, densely appressed-pubescent. Ovary 3 × 3 mm, densely short pubescent with tubercular processes 0.5–2 mm long; style stout, 2 mm long, appressed pubescent from base to apex. Young fruit oblong, rounded at apex, 1.5–1.7 cm long, 1 cm wide, unequally spinose-tuberculate with rigid stout spines broad at base, 2–3 mm long except absent in the basal 3–4 mm, the tubercles minutely appressed-pubescent; more mature fruit wine purple, 2 cm long, 1.5 cm wide, the spines slender-tipped.

Paratype. VENEZUELA. T. F. AMAZONAS: Dept. Atabapo, Caño Negro, río arriba desde la confluencia con el Río Cunucunuma, 3°40′N, 65°45′W, 200–210 m, 8 Feb. 1982, *Steyermark et al. 126231* (NY, VEN).

This species is characterized by elongated glabrescent pedicels recurved at the apex; elongated, irregularly laxly subpaniculate-racemose inflorescence; short-awned, densely appressed pubescent anthers much shorter than the densely pubescent filaments; stout appressed pubescent style; short, rigid, tubercular spines on a surface lacking tubercules in the basal portion; and general glabrity of stems and leaves. The fruiting structures show similarity to some members of sect. *Paniculi* C. E. Smith, such as *Sloanea caribaea* King & Urban ex Duss. However, the absence of material in full anthesis makes the placing of *S. wurdackii* uncertain. The large leaf blades and elongate petioles somewhat resemble those of *S. schomburgkii* Benth., but that species has longer anthers, which are longer than the filaments.

Although no stamens are present on the paratype, it is referred to the new species because the paratype has the characteristics shortly spinose fruit with rigid slender spines, which are absent in the basal area; the same type of elongated slender, recurved pedicels in an elongated inflorescence; similarly elongated petioles; similar leaf size, shape, and nervation; and general glabrity of the stems, petioles, pedicels, and foliage. The main differences noted in the paratype are the fewer lateral nerves which are farther apart, the lowest ones more spreading at a lesser angle; the leaf bases more rounded or broadly obtuse; and the peculiarly pitted upper surface of the leaf blade.

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BOMBACACEAE

POCHOTA

The following name was inadvertently omitted from the recent publication of this genus by Steyermark & G. W. Stevens (1988):

Pochota robynsii Steyerm. & W. D. Stevens, nom. nov.

Bombacopsis coriacea Robyns, Mem. New York Bot. Gard. 17: 190. 1967, not *Pochota coriacea* (Mart. & Zucc.) Steyerm. & W. D. Stevens.

LITERATURE CITED

STEYERMARK, J. & W. D. STEVENS. 1988. Notes on *Rhodognaphalopsis* and *Bombacopsis* (Bombacaceae) in the Guayanas. Ann. Missouri Bot. Gard. 75: 396–398.

THEACEAE

In the *Flora of the Venezuelan Guayana—III* (Steyermark, 1987b), *Bonnetia bolivarensis* Steyerm., *B. guaiquinimae* Steyerm., *B. ptariensis* Steyerm., and *B. tristyla* subsp. *nervosa* Steyerm. were inadvertently republished. They were published earlier in the same volume and year (Steyermark, 1987a). The holotype specimen remains the same in *B. bolivarensis*, *B. guaiquinimae*, and *B. ptariensis*. In *B. tristyla* subsp. *nervosa*, although the citation of the holotype was changed from *Steyermark & Bunting 103153* to *Maguire et al. 30632*, the original holotype citation of *Steyermark & Bunting 103153* must be retained.

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STEYERMARK, J. 1987a. Flora of the Venezuelan Guayana—II. Ann. Missouri Bot. Gard. 74: 102–103.

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